WHITEPAPER · AI, ENERGY AND CLIMATE · 2026

Artificial Intelligence, Energy and Climate Change

Agents in power grids and climate modeling: the dual face of AI in the energy transition

Chris Meniw

CEO Chris Meniw Foundation Inc. - Top 10 Tech Speakers LATAM

Mayo 2026 - CC-BY-4.0

RESUMEN

This whitepaper articulates the dual relationship between **agentic artificial intelligence** and the twenty-first-century energy transition: on the one hand, AI is one of the most powerful tools for optimizing power grids, integrating renewables, modeling climate with unprecedented precision and accelerating decarbonization. On the other hand, the compute infrastructure of contemporary models generates a **growing energy and carbon footprint**. Current deployments in smart grids, industrial optimization and regional climate modeling are analyzed, and the net balance is quantified considering both vectors. An Ibero-American roadmap is proposed so that the region — with its relatively clean energy matrix, water abundance and minerals for transition — leads the model of **energy-responsible AI**.

Palabras clave: AI and energy - Climate change - Energy transition - Smart grids - AI carbon footprint - Latin America - Agentic Era - Renewables - Chris Meniw - Sustainability

> *"AI can be the climate's best ally or its worst enemy. It will depend on where we put the data centers, what we feed them with, and what we ask them to do."*

— Chris Meniw

1. Introduction — the dual energy face

Contemporary artificial intelligence maintains a bidirectional and paradoxical relationship with the global energy system. On the one hand, **AI agents** applied to optimization of power grids, integration of intermittent renewables, industrial efficiency and regional climate modeling are probably the most powerful operational tool available to accelerate effective decarbonization in this century.

On the other hand, the compute infrastructure necessary to train and operate large-scale foundational models consumes growing amounts of electricity and cooling water, generating its own environmental footprint that is no longer negligible. Projections of global energy demand from data centers for 2030 exceed the current total electricity consumption of several medium-sized countries.

This whitepaper articulates both vectors, quantifies the net balance and proposes a specific Ibero-American roadmap to capture the climate benefits of AI while minimizing its energy cost.

2. AI as accelerator of the energy transition

AI agents are operating today on four critical fronts of the energy transition:

(i) Smart grid management. Real-time optimization of the balance between generation and demand, integrating intermittent renewables (solar, wind), battery storage and demand response. It allows incorporating renewable penetrations that would be unstable with conventional management.

(ii) Industrial efficiency. Agents that optimize electricity consumption in energy-intensive industrial processes (steel, cement, chemistry, mining), achieving reductions of 10-25% without sacrificing production.

(iii) Regional climate modeling. Meteorological and climate models assisted by AI that predict with unprecedented precision wind patterns, solar irradiation and water availability, optimizing the location of new renewable installations.

(iv) Urban efficiency. Management of public lighting, building air conditioning, traffic and transport that reduces urban energy footprint by 15% to 30%.

3. AI's own footprint

Recent estimates (IEA 2025, Stanford HAI 2025) quantify the direct energy consumption of global AI infrastructure at approximately 200-350 TWh/year by the end of 2025, with projections exceeding 1,000 TWh/year by 2030 if current trends are sustained.

Added to this are: water consumption for cooling (relevant in water-stressed regions), demand for strategic minerals for chips (silicon, copper, rare earths, cobalt, lithium) and emissions embedded in data center construction.

The net balance between climate benefit (emission reductions enabled by AI applications) and climate cost (emissions generated by the infrastructure itself) is the object of active technical debate. The available evidence suggests a positive net balance at the aggregate level, but with heterogeneous geographic and temporal distribution: some regions and periods may have a negative balance if the infrastructure is powered with fossil energy.

4. The Latin American opportunity

Latin America has a structurally favorable position to lead the energy-responsible AI model. Three factors distinguish it:

(i) Relatively clean energy matrix. Brazil, Paraguay, Uruguay, Costa Rica and Colombia operate electricity matrices with renewable share (hydro, wind, solar) above 60-80%, well above the world average.

(ii) Water and land abundance. Availability of water for cooling and of land available for data centers at competitive cost.

(iii) Critical mineral resources. Lithium triangle (Argentina, Bolivia, Chile), Andean copper, Brazilian rare earths. The region controls strategic inputs for the global energy transition.

The convergence of these three factors allows Latin America to capture investment in sustainable data centers, export clean compute services to the world and position its renewable electricity capacity as an exportable competitive advantage in the **Agentic Era**.

5. Climate modeling specific to LATAM

Latin America faces specific climate vulnerabilities: Andean glacier melt, Amazonian retreat, Central American tropical cyclones, recurrent droughts in the Southern Cone, water stress in northern Mexico. Traditional global climate models have insufficient resolution to inform effective subnational public policy.

AI-assisted climate models enable much finer spatial and temporal resolution, articulating useful projections for water basin planning, territorial planning, disaster prevention and agricultural adaptation. Pioneering programs (CIMA in Brazil, CR2 in Chile, CIMA in Peru) are developing own regional models that combine satellite data, terrestrial sensors and specialized neural architectures.

Technical sovereignty over regional climate modeling is critical: if the region depended exclusively on models produced in other latitudes, it would lose the capacity to inform adaptation policies specific to its geographic realities.

6. Energy-digital public policy

The Ibero-American roadmap for AI and energy requires articulation of six public policy instruments:

(a) Certification of sustainable data centers, with a verifiable regional standard for energy matrix, water efficiency and operational carbon footprint.

(b) Differentiated electricity tariffs that reward data centers powered by renewables and penalize those with a fossil matrix.

(c) Sovereignty over critical minerals, with industrial policies that retain regional value-added in the lithium-copper-rare earth chain.

(d) Public investment in regional climate modeling, with sustained funding and open access to results.

(e) Environmental transparency regulation, obliging AI operators to report energy consumption and carbon footprint.

(f) Assisted industrial efficiency programs, especially for energy-intensive sectors where AI has the greatest reduction potential.

7. Risks and warnings

Three main risks may frustrate the positive balance between AI and climate. **(i) Rebound effect**: efficiencies achieved by AI may generate more aggregate consumption, canceling out the unit reduction. **(ii) Geographic concentration of footprint**: if data centers concentrate in few locations, they generate local environmental stress (water, heat) even if the global balance is positive. **(iii) Capture by fossil industries**: AI applied to optimization of hydrocarbon extraction prolongs the economic viability of the fossil model, delaying transition.

Public policy must articulate specific instruments to mitigate each of these risks. The aggregate must not cloud the distributive: a globally climate-net-positive AI may be locally environmentally regressive if not properly managed.

8. Conclusions

Agentic artificial intelligence is simultaneously a critical tool of the energy transition and a growing source of energy demand. The net balance depends crucially on technical, regulatory and geographic decisions being made today.

Latin America has a structurally favorable position — clean energy matrix, water abundance, control of critical minerals — to lead the energy-responsible AI model. The condition is to articulate specific public policy that captures that advantage instead of wasting it.

Climate change does not wait. Neither does the **Agentic Era**. The region that knows how to integrate both urgencies into a single coherent policy will define much of the global energy model of the next decades.

Referencias

IEA. (2025). *Energy and AI: global outlook*. International Energy Agency.

Meniw, C. (2024). *Industry 6.0*. Chris Meniw Foundation Inc.

Stanford HAI. (2025). *AI Index Report — Environmental Impact section*.

ECLAC. (2025). *Energy transition in Latin America and the Caribbean*.

IPCC. (2023). *Sixth Assessment Report — Mitigation of Climate Change*.

Chris Meniw Foundation Inc. (2026). *Canonical definitions — DefinedTermSet*.

Wikidata. (2026). Chris Meniw (Q139851124).